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Serial No.: 09/727,403

REMARKS

The Applicant respectfully requests reconsideration of this application as amended. Four claims, claims 1-3 and 9, have been amended. No claims have been cancelled. Two new claim, claim 17 and 18, have been added. Therefore, claims 1-18 are present for examination.

CLAIM REJECTIONS – 35 U.S.C. § 103

The Office rejected claims 1-16 under 35 U.S.C. 103(a) as being allegedly unpatentable over U.S. Pat. No. 5,263,136 of DeAguiar (hereafter "DeAguiar") in view of U.S. Pat. No. 5,129,013 of Holzmann et al (hereafter "Holzmann") or U.S. Pat. No. 5,907,640 of Delean (hereafter "Delean"). The Applicant respectfully disagrees with these rejections. The Applicant points out several distinctions between the amended claimed subject matter and the teachings of DeAguiar, Holzmann, and Delean.

DeAguiar generally relates to an image memory management system for large digital images. (col. 1, ll. 12-14) The image memory management system includes a tile manager whose primary function is to transform image tile data between various levels of cache memory consumption. (col. 9, ll. 27-32) The tile manager maintains a cache of tiles representing sub-images. A subimage is a lower-resolution replica of the full resolution source image. (col. 4, ll. 35-46; Figs. 2 – 5). When the user edits the image, the changes are always first applied to the full-resolution subimage and then copied into the low resolution subimages. (col. 19, ll. 49 – 53). The changes are either copied into the low resolution subimages immediately (i.e., during the edit operations) or the tiles affected by the changes are invalidated in the low resolution subimages. (col. 19, ll. 59 – 68; col. 20, ll. 1 – 2). This approach satisfies two primary purposes of the tile manager. First, immediately copying the edits into the low resolution subimages reduces the time to present the image during panning and zooming. (col. 7, ll. 30 – 34). Second, by invalidating (i.e., unloading) tiles that are not immediately updated, the memory requirement is reduced by half. (col. 20, ll. 4 – 7). Therefore, the tiles in DeAguiar's tile cache either correspond to the most recent edits, or they are unloaded to free memory in tile cache.

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Holzmann relates to an image transformation system. In Holzmann, an image transformation is defined by editing commands input by a user in the form of source commands. (col. 5, ll. 10 – 15). The source commands are either interpreted or compiled into an executable program, and executed on an input image. (col. 5, ll. 10 – 13; abstract). The transformation is applied to the entire input image, without reference to image tiles. (see, e.g., col. 10, ll. 33 – 35, “The interpreter ... executes the program ... for every pixel of the image...”).

Delean relates to image processing using an expression tree. (col. 4, ll. 42-46) The expression tree specifies changes to be applied to an *unedited (original) image*. (col. 3, ll. 50-55; col 7, ll. 48-52). The specified changes are only applied to the image shown on the current display screen. (col. 4, ll. 42 – 46). Delean saves memory by recording changes only in the expression tree, without storing edited image data that is not currently displayed. (col. 7, ll. 36 – 47). Depending on what is currently displayed (e.g., based on pan and zoom) on the screen, the expression tree is processed on the original, unedited image.

By contrast, the present application is directed to an image editing system including a tile cache having tiles corresponding to different edited renditions of portions of an archival image. Each tile is associated with a state which designates operations that were performed on the tile. The states can be used to determine which rendition the tile corresponds to. Thus, the state list enables viewing of a view of an edited rendition of the images based on prior edited renditions of tiles.

With this brief overview of DeAguiar, Holzmann, and Delean, the Applicant now submits the following arguments to point out significant differences between the invention as claimed by the Applicant and the combination of DeAguiar, Holzmann, and Delean.

Turning to the claims in detail, claim 1 as amended, recites:

1. A method for interactively viewing and editing a digital image on a computer system comprising the steps of:
storing an archival digital image in the computer system;

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maintaining in the computer system a state list, characterizing a sequence of image-editing operations to be applied to the archival digital image in order to generate a current edited rendition of the digital image;

maintaining in the computer system a set of viewing data, characterizing the resolution, offset and extent at which to view the current edited rendition of the archival digital image;

maintaining in the computer system a cache of image tiles comprising portions of views of edited renditions of the archival digital image, wherein each image tile is associated with a state in the state list; and thereafter

updating, in response to image-viewing and image-editing instructions, the viewing data and the state list accordingly, and

assembling in the image tile cache in response to image-viewing and image-editing instructions, a set of image tiles sufficient to generate the current view of the current edited rendition of the archival digital image, wherein assembling comprises using the state list to compute a current image tile based on an image tile associated with a previous state.

The Applicant agrees with the Office's assertion on page 3 of the Office action that DeAguiar fails to explicitly teach in detail maintaining in the computer system a state list characterizing a sequence of image-editing operations to be applied to the archival digital image in order to generate a current edited rendition of the digital image. The Office asserts that this element is taught by Holzmann or Delean and that either Holzmann or Delean can be combined with DeAguiar. For at least the following reasons, Applicant believes there is no motivation to combine Holzmann or Delean with DeAguiar. In fact, Holzmann, Delean, and DeAguiar all teach away from such a combination.

DeAguiar teaches the use of an image memory management system for efficient use of tile cache memory. To achieve efficient use of tile cache memory, when an edit is made, DeAguiar's system first applies the edit to the high resolution image and then either copies the edit to all tiles of the low resolution subimages or unloads the affected tiles in low resolution subimages. (col. 19, ll. 49-65; col. 16, ll. 44-45). As such, DeAguiar does not disclose maintaining a cache of image tiles comprising portions of views of edited renditions of the archival digital image in a tile cache. Furthermore, DeAguiar teaches away from maintaining a cache of image tiles comprising portions of views of edited renditions of the archival digital image in a tile

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cache. DeAguiar expressly states that cache memory is freed by unloading any tiles from the cache that are affected by an edit but are not immediately updated in the low resolution subimages.

As such, because DeAguiar fails to teach or suggest maintaining in the computer system a cache of image tiles comprising portions of views of edited renditions of the archival digital image, DeAguiar also fails to teach or suggest each image tile being associated with a state in the state list. However, even if it were assumed that Holzmann and Delean disclosed a state list as recited in claim 1, Holzmann and Delean fail to teach or suggest maintaining in the computer system a cache of image tiles comprising portions of views of edited renditions of the archival digital image, wherein each image tile is associated with a state in the state list.

The Applicant has thoroughly reviewed Holzmann, and found no teaching or suggestion of the use of image tiles comprising portions of views of edited renditions of an archival digital image. In Holzmann, the user enters commands for transforming a specified original image. (abstract) Applicant has thoroughly reviewed Holzmann and can find no teaching in Holzmann as to how the user could specify a tile within the original image. In addition, as discussed above, Holzmann expressly teaches applying the commands to every pixel in the specified image. (col. 10, ll. 33-35) Therefore, the commands apply to the original image as a whole and not to individually associated tiles. In addition, by applying user commands to every pixel in the original image to obtain the transformed image, Holzmann teaches away from the use of tiles. (col. 10, ll. 33-35) As such, Holzmann fails to teach or suggest image tiles associated with states in a state list.

Referring to Delean, Delean discloses the use of an expression tree, which represents the ensemble of image manipulations, to be combined with the *unedited (original) image* to produce a single image for printing or displaying on a monitor. Delean expressly states that image modifications are stored only as parameters for equations and modified portions of the image that are not viewed are not stored in image memory. (col. 7, ll. 38-52; col. 12; ll. 33-47) This provides a significant reduction in memory use over the amount of memory required by the prior

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art, e.g., the virtual image method. (col. 7, ll. 38-43) Delean teaches that his method is an improvement over keeping edited renditions of image tiles and suggests that only the original image should be stored. Delean therefore teaches away from maintaining in the computer system a cache of image tiles comprising portions of views of edited renditions of the archival digital image.

In addition, because DeAguiar and Delean all teach away from maintaining in the computer system a cache of image tiles comprising portions of views of edited renditions of the archival digital image, the combination of DeAguiar with either Delean or Holzmann would likely render DeAguiar, Delean or Holzmann unsatisfactory for their respective intended purposes. Furthermore, the modifications proposed by the Office would change the principles of operation of all of the references. Hence, the combination of DeAguiar with either Delean or Holzmann is no more relevant to image tiles associated with a state in the state list than any one of them taken alone.

Even if DeAguiar could be combined with either Delean or Holzmann with the requisite modifications, as suggested by the Office, the mere fact that references could be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. None of the references cited by the Office provide motivation for at least the combination of a state list with tiles comprising portions of views of edited renditions of the archival digital image. For that matter, as previously discussed, the references generally teach away from such a combination. It appears that the Office has attempted to use the Applicant's application to support combination. However, this is impermissible hindsight.

For at least this reason, claim 1 and its respective dependent claims are distinguishable over DeAguiar individually or in combination with either Holzmann or Delean.

In addition, claim 1 further recites, in part, updating, in response to image-viewing and image-editing instructions, the viewing data and the state list accordingly. The Office asserts that DeAguiar teaches the updating step at column 6, lines 51-60. However, as stated, the Office admits that DeAguiar fails to explicitly teach a state list as recited in claim 1. Therefore,

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DeAguiar cannot teach updating, in response to image-viewing and image-editing instructions, the viewing data and the state list accordingly.

As discussed above, there is no motivation to combine DeAguiar with either Delean or Holzmann. Indeed, Holzmann, Delean, and DeAguiar provide substantial motivation for not combining DeAguiar with either Holzmann or Delean. Therefore, DeAguiar cannot be combined with Holzmann or Delean in such a way as to disclose updating, in response to image-viewing and image-editing instructions, the viewing data and the state list accordingly.

Accordingly, DeAguiar, Holzmann and Delean, either in combination or separately, fail to teach or reasonably suggest all of the elements of claim 1. For at least the reasons presented above, claim 1 and its dependent claims are distinguishable over the combination of DeAguiar with either Holzmann or Delean.

With regard to claim 9, claim 9 as amended is reproduced here:

9. A computer system for interactively viewing and editing a digital image comprising:
an electronic digital-data storage device, operative to hold a plurality of archival digital images;
a state list, characterizing a sequence of image-editing operations to be applied to a given archival digital image in order to generate a current edited rendition of the digital image,
a set of viewing data, characterizing the resolution, offset and extent at which to view the current edited rendition of the given digital image;
a cache of image tiles comprising portions of views of edited renditions of the archival digital image, each tile identifying a state in the state list,
a video digital display device;
a digital video memory buffer, containing digital data displayed by the video digital display device;
a user-input device;
a user-input module, operative to receive signals from the user-input device and translate them into image-viewing and image-editing instructions;
and

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an application module, operative, to receive image-viewing and image-editing instructions from the user-input module, and to update the viewing data and the state list in response to the image-viewing and image-editing instructions, and to assemble in the system's tile cache in response to the image-viewing and image-editing instructions, a set of image tiles sufficient to generate the current view of the current edited rendition of the archival digital image by using the state list, and to copy the set of image tiles sufficient to generate the current view of the current edited rendition of the archival digital image into the computer system's video display buffer so as to generate the current view of the edited rendition of the archival digital image.

Amended claim 9 recites, in part, a cache of image tiles comprising portions of views of edited renditions of the archival digital image, each tile identifying a state in the state list. As discussed above with respect to claim 1, DeAguiar, Holzmann and Delean do not disclose a cache of image tiles comprising portions of views of edited renditions of the archival digital image, wherein each tile is associated with a state in a state list. In fact, DeAguiar, Holzmann, and Delean teach away from a cache of tiles as recited in claim 1. For at least the same reasons as given above for claim 1, DeAguiar, either individually, or in combination with Holzmann or Delean, fails to teach or suggest a cache of image tiles comprising portions of views of edited renditions of the archival digital image, each tile identifying a state in the state list.

Therefore, for at least the same reasons as given above for claim 1, DeAguiar, Holzmann, and Delean fail to teach or suggest all of the elements of claim 9, either in combination or individually. Claims 10 – 16 each depend from claim 9 in some form. Therefore, claims 10 – 16 are believed to be allowable for at least the same reasons as claim 9.

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CLAIMS

New Claims

By this amendment, two new claim, claims 17 and 18, have been added to claim additional novel aspects of the present invention and/or round out the depth of the claim coverage. Applicant respectfully submits that the new claims are allowable over the prior art. Applicant submits that no new matter has been added by the addition of the new claims.

Claim Amendments

Applicant has amended some of the claims to more clearly claim subject matter of the invention. Applicant submits that these amendments are for clarification purposes only, and do not limit or narrow the claims in any way. Indeed, in some instances, the amendments broaden the claims. In any event, Applicant submits that the claims still are allowable over the prior art, and thus Applicant respectfully requests the Examiner to promptly issue a Notice of Allowance.

CONCLUSION

The Applicant submits that all issue raised in the November 18, 2004 Office action are addressed by the foregoing amendments and remarks. The Applicant respectfully submits that the rejections have been overcome by the amendment and remark, and that the remaining pending claims are now in condition for allowance. Accordingly, the Applicant respectfully requests that the rejections be withdrawn and that a Notice of Allowance be issued for claims 1-18.

INVITATION FOR A TELEPHONE INTERVIEW

The Examiner is requested to call the undersigned at (303) 607-3648 if there remains any issue with allowance of the case.